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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,185	12/18/2000	Takayuki Araki	P06971US00/L	2588

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EXAMINER	
RUTHKOSKY, MARK	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
12/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/700,185	ARAKI ET AL.	
	Examiner	Art Unit	
	Mark Ruthkosky	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-30,35-44,46 and 49-52* is/are pending in the application.

4a) Of the above claim(s) *1,5-29,37,41-45,47 and 48* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *30,35,36,38-40,46 and 49-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 30 and the claims depending from claim 30 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a specific material that has a molecular weight of 3000 to 1,200,000, does not reasonably provide enablement for segment B of claim 30 to have a molecular weight in the range of 3000-1,200,000. Applicant has pointed to page 28 of the original specification as support for this amendment (see arguments on page 2 of the response filed 10-12-2007,) however, no molecular weight is found on that page. A molecular weight of 3000 to 1,200,000 is disclosed on page 27 for a segment labeled D1 containing sulfonic acid according to a formula provided on page 27. However, the claim is to a segment B containing no sulfonic acid functional groups.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure of molecular weight on page 27 does not correspond to the claimed segment B in amended claim 30.

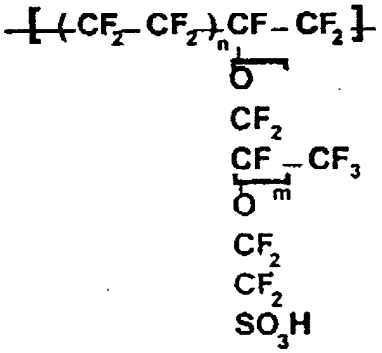
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 30, 35-36, 38-40, 46, and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cisar (US 6,492,431) OR Cisar (US 5,635,039.)

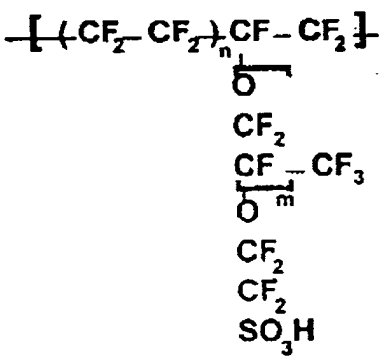
Cisar (US 6,492,431) teaches a material for a solid polyelectrolyte, comprising a multi-segmented fluoropolymer that comprises a block copolymer containing at least two types of fluoropolymer chain segments differing in monomer composition, at least one type of the fluoropolymer chain segments containing sulfonic acid functional groups.



One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The crystalline melting point is over 300 C. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b)

at least one type of ethylenic fluoromonomer unit copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is further noted that the polymer may include a sulfonyl fluoride group (figure 3 and accompanying text.) The material is commonly known as Nafion, which has an equivalent weight of 400-1600, (see example 2 for a weight of 950.) The ratio of segment A to segment B in the fluoropolymer is in the range of 5:95 to 98:2 wt. % (col. 5, lines 60-65.) As the materials of the reference and the instant invention are equivalent, the modulus of elasticity of the materials will be the same.

Cisar (US 5,635,039) teaches a material for a solid polyelectrolyte, comprising a multi-segmented fluoropolymer that comprises a block copolymer containing at least two types of fluoropolymer chain segments differing in monomer composition, at least one type of the fluoropolymer chain segments containing sulfonic acid functional groups. The material is defined to be Nafion, which has the following structure:



One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The crystalline melting point is over 300 C. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b)

at least one type of ethylenic fluoromonomer unit copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is further noted that the polymer may include a sulfonyl fluoride group (col. 13, lines 7-17.) The material is commonly known as Nafion, which has an equivalent weight of 400-1600, (see col. 7, lines 45-end for a weight of 1100.) The ratio of segment A to segment B in the fluoropolymer is in the range of 5:95 to 98:2 wt. % (col. 5, lines 60-65.) As the materials of the reference and the instant invention are equivalent, the modulus of elasticity of the materials will be the same.

The references do not teach molecular weights for segment A and segment B. The references are silent to the molecular weight of the material. The Cisar references, however, disclose materials that comprise segment blocks containing polytetrafluoroethylene groups (PTFE) and perfluorovinyl ester with sulfonic acid functional groups, commonly known as Nafion. The references show that each segment has a function in the copolymer. The Nafion component gives an ion-conducting element to the copolymer and the PTFE component gives a structural reinforcing element to the copolymer (see '431, col. 8, lines 30-44. and col. 7, lines 15-30.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the amount of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application. For example, a fuel cell ion-conducting membrane may require a greater amount of an ion-conducting segment in order to conduct hydrogen. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

Response to Arguments

Applicant's arguments filed 10/12/2007 have been fully considered but they are not persuasive.

Applicant argues that the references do not teach the recited molecular weight of segment B. This has been addressed in the rejection. The references are silent to the molecular weight of the material. The Cisar references, however, disclose the same materials that comprise segment block A, containing polytetrafluoroethylene groups (PTFE), and B, containing perfluorovinyl ester with sulfonic acid functional groups, commonly known as Nafion. The references show that each segment has a distinct function in the copolymer. The Nafion component gives an ion-conducting element to the copolymer and the PTFE component gives a structural reinforcing element to the copolymer (see '431, col. 8, lines 30-44. and col. 7, lines 15-30.) It would have been obvious to one of ordinary skill in the art made to alter the amount of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application. The formula that shows the segment includes the variable "n" that allows for the amount of the backbone material to be altered. Adding more monomer will increase the molecular weight. It is further noted that since segment B includes the same units as the ethylenic fluoropolymer of segment A, there is not a well-defined boundary in the polymer since different blocks may have a different number of units in the polymer. Thus, the combination of segments and the respective weights of each segment would be obvious to one skilled in the art based on the teachings of the Cisar references.

Applicant argues that the copolymer comprising segment B with a molecular weight as high as 3,000 to 1,200,000 in a proportion of 2 wt. % or more cannot be obtained simply by

mixing the monomer of segment A and the monomer of segment B, and allowing them to react, however offers no support or evidence for the statement. Further, one of ordinary skill in the art would understand that including more "n" groups would increase the weight of the polymer segment, and the amount of each segment would still be in the claimed range as they are disclosed in a ratio of 50:50 (also see col. 5, as noted below that shows a ration of 1:99 to 99:1.) Thus, the reference teaches the claimed ratio of segments.

Applicant argues that the Cisar reference fails to teach one of ordinary skill in the art how to practice the claimed invention. Applicant states that Cisar '831, column 7, lines 15-30, states "[The] methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane." Applicant then argues, "With the techniques used in fabricating a conventional random polymer membrane as taught by Cisar, however, there is very little probability of obtaining a "block" of segment B with a molecular weight as high as 3,000 to 1,200,000."

This argument is not persuasive. First, it is noted that applicant is referring to the '431 reference applied in the rejection. Second, applicant is excluding the entire paragraph, shown below. The reference clearly states that membrane may be blended as well as alternating blocks of each type of segment described (col. 7, lines 15-30.)

> The composite membranes fabricated by the methods of the invention may comprise randomly blended polymers as well as alternating blocks, each block comprising essentially one particular polymer. For example, a composite membrane may be fabricated by forming, within each molecule, regions of pure PTFE and regions of low equivalent weight copolymer. The pure PTFE regions may crystallize to form a reinforcing matrix, while the low equivalent weight regions may furnish high proton conductivity paths. The methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane.

(Also note the teachings of col. 8, lines 5-15.)

> For example, a composite membrane may be fabricated by forming, within each molecule, regions of pure PTFE and regions of low equivalent weight copolymer. The pure PTFE regions may crystallize to form a reinforcing matrix, while the low equivalent weight regions may furnish high proton conductivity paths. The methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane.

Cisar states that the polymer may include regions of pure PTFE and regions of the proton conductive region having sulfonic acid functional groups (col. 7, lines 15-30.) The material is referred to as a polymer block-type as compared with a random polymer. Further, the reference defines the PTFE segment to provide a reinforcing matrix and the proton conductive sulfonic acid region as a high proton conductive region (see '431, col. 7, line 15 to col. 8, line 15.) These regions are equivalent to those in applicant's claimed invention. Even the statement of Cisar teachings submitted by applicant in this argument discloses block polymers. The reference clearly states that the material may be a block copolymer comprising both units of PTFE and a mixed polymer with sulfonic groups included.

Applicant further argues that, "the molar ratio of tetrafluoroethylene ("TFE") in commercially available Nafion is about 86.7%. The molecular weight of TFE (CF2CF2) is 100. Hence, assuming that the molar ratio of TFE is 86.7%, the probability of the formation of a

segment that consists only of TFE and has a molecular weight of 3,000 in, for example, "Nation" disclosed by Cisar is given as noted."

This argument is not persuasive. First, applicant offers no support or evidence for the assertion of the ratio assumption. Second, the ratio is not a probability, but a ratio, and therefore the probability calculation is not accurate with regard to the molar ratio. Applicant's statement shows that the molar ratio of segment B is 86.7%, which falls into the claimed range. Further, the reference teaches that, "The methods of the invention may allow the fabrication of polymer compositions where the proportions of the individual components may vary between 1-99 weight percent (col. 5, lines 40-65.) The complete teaching is noted.

> The methods of the invention allow for combining the components in the composite membrane over a wide range of ratios between the components. Depending on the use of the membrane, a certain physical property may be more desirable than the other and the proportions of the components in the membrane may be adjusted to obtain the desired balance between the physical properties provided by each component.
>
> For example, in a composite polymer membrane having an inert component and an ion conducting component, when high ion conductivity is the more desirable quality, the proportion of the ion conducting polymer may be maximized and the portion of the inert polymer minimized. Conversely, in applications where the structural properties may be more important, the proportion of the inert component may be maximized and the proportion of the conducting component minimized.
>
> Since the methods of the invention allow intimate mixing of the components in the composite membrane, a component may be able to confer to the composite membrane its qualities even when the component is provided in minimal proportions. The methods of the invention may allow the fabrication of polymer compositions where the proportion of an individual component may vary between about 1 wt. % and about 99 wt. %.

Finally, even if a small amount of material prepared as asserted by applicant, then the material reads upon the claimed invention.

Finally, applicant argues that there fails to be any apparent reason why one of ordinary skill in the art would have modified the molar ratios of the Cisar references to arrive at the claimed ratios (page 4 of the arguments.) Applicant states the Examiner provides a conclusionary statement that it would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the amounts of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application, but the Examiner has failed to allege any facts supporting such a conclusion.

The reference teaches the block polymer components may vary between 1-99 weight percent (col. 5, lines 40-65.) Thus, this limitation is explicitly taught in the reference. The rejection clearly gives the reason why one of ordinary skill in the art would choose the molar ratios in the Cisar references to give a specific mixture. Cisar teaches that the polymer may include regions of pure PTFE and regions of the proton conductive region having sulfonic acid functional groups (col. 7, lines 15-30.) The material is referred to as a polymer block-type polymer. The reference defines the PTFE segment to provide a reinforcing matrix and the proton conductive sulfonic acid region as a high proton conductive region (see '431, col. 7, line 15 to col. 8, line 15.) These regions are equivalent to those in applicant's claimed invention. The reference clearly states that the material may be a block copolymer comprising both units of PTFE and a mixed polymer with sulfonic groups included.

Applicant has chosen to ignore these facts presented in the body of the rejection and taught in the references. Based on the facts included in the art and rejection of record, Applicants assertion that the Examiner has failed to allege any facts supporting such a conclusion is clearly wrong. Thus, the claims stand rejected over the applied references.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky

Primary Patent Examiner

Art Unit 1745

MARK RUTHKOSKY
PRIMARY EXAMINER
12.20.07